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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 08/900,254
Filing Date: July 25, 1997
Appellant(s): PFEUFFER, PETER

Mr. Thomas Hughes
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 09-24-04.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. However, it should be noted that, an appeal brief on related claims was filed on 04-19-00 for this application. A decision from the board was rendered on 02-20-02 affirming the rejection of related claims.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claim 1 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

4,496,583	Yamamoto et al	01-1985
4,876,007	Naruo et al	10-1989
2,862,542	Norton	12-1958
4,772,443	Thornton et al	09-1988
5,492,580	Frank	02-1996
3,616,167	Gosden	10-1971
DE 4,024,053 A1	Petranyi et al	01-1992

Yamamoto et al, drawn to forming a filter sheet with excellent material strength, discloses forming the sheet from a blend of undrawn polyester fibers and drawn polyester fibers. (col. 2 line 64 to col. 3 line 21; col. 9 line 59 to col. 11 line 47). In addition, Yamamoto et al also discloses that the undrawn fibers can be fuse-bonded at a low temperature and teaches pressing the sheet using heated calender rolls (col. 3 lines 11-21; col. 5 lines 1-4; and col. 8 paragraph 5).

Naruo et al, drawn to forming filters, discloses the advantages of using pleated filters over unpleated filters.

Norton, drawn to making a corrugated filter, discloses using a pair of profiled calender rolls to form a corrugated filter from a fibrous sheet (figures 1-2).

Thornton et al, Frank, DE 4024053 A1, and Gosden are cited to show that, it is well known and conventional in diverse fields of art to subject a fiber web comprising heat-activated binder fibers to a preheating operation, before the web is compressed using a pair of unheated/cold rollers.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al (US 4,496,583) in view of Narou et al (US 4,876,007)) and Norton (US 2,862,542) and further in view of (Thornton (US 4,772,443), Frank (US 5,492,580), DE 4024053 A1, and Gosden (US 3,616,167).

> A discussion herein relating to the Yamamoto et al, Narou et al, and Norton patents is essentially repetition to a ground of rejection set forth in an Examiner's Answer dated 05-02-00. This discussion is rewritten herein for the convenience of the board members.

Yamamoto et al discloses a method of forming a paper-like polyester sheet having an enhanced filtering property and excellent material strength, the method comprises blending undrawn polyester fibers with drawn polyester fibers; and forming the paper-like sheet from the blend (col. 2 line 64 to col. 3 line 21; col. 9 line 59 to col. 11 line 47). In addition, Yamamoto et al also discloses that the undrawn fibers can be fuse-bonded at a low temperature and teaches pressing the sheet using a pair of heated calender rolls (col. 3 lines 11-21; col. 5 lines 1-4; and col. 8 paragraph 5).

Yamamoto et al is silent on forming *"spacers"* (i.e. pleats) on the paper-like sheet. In other words, Yamamoto is silent on making a pleated filter paper sheet. In addition,Yamamoto et al does not also teach calendering the paper-like sheet using

profiled calender rolls to form the pleated filter sheet. However, it would have been obvious in the art of making a filter media to form spacers on the paper-like sheet of Yamamoto (i.e. to form a pleated filter paper sheet), because it is notoriously well known in the filter art to form a pleated filter sheet; and because Naruo et al disclose that *"The pleat-type filter cartridge has an advantage in that the area of the filtration membrane within a unit volume (effective filtration area) can be increased to thereby attain an enormous filtration flow rate per unit time. Therefore, the pleat-type filter cartridge is useful for large-scale filtration in the filed ..."* (col. 1 lines 23-39). Furthermore, it would have been obvious in the art to calender the paper-like sheet using profiled calender rolls to form a pleated filter sheet in the process of Yamamoto et al because: a) Yamamoto et al discloses that the paper-like sheet can be impregnated with a resinous material, calendered, etc. (col. 5 lines 1-4); b) Norton discloses forming a corrugated (pleated) paper filter by calendering a fibrous sheet using a pair of profiled calender rolls (figures 1-2); and c) it is well within the purview of choice in the art to choose from known methods based on their suitability for their intended purpose or use, none but the expected result of effectively forming a pleated filter would have been achieved.

As for the limitation that there is no *"inhomogeneities over the cross section of the non-woven fabric"*, Yamamoto et al discloses uniformly dispersing the blend of fibers and accordingly, the resultant sheet exhibit satisfactory properties such as: volume fraction, coefficient of air flow resistance, tensile strength, etc. (col. 6 lines 43-49; col. 10 lines 62-68). These teachings would logically suggest to one in the art that there is no

inhomogeneities over the cross-section of the nonwoven fabric. As for the limitation that the fibers are *"bonded in a tension-free manner between profiled calender rolls"*, since neither Yamamoto et al nor Norton expressly teaches exerting any tension to the fibrous sheet during the calendering/bonding operation (see, for intance the process taught by Norton in figures 1-2; the fibrous web is not being pulled or stretched during the calendering operation or after the web has passed though the calender rolls); and, as noted earlier, Yamamoto et al teaches the fibers are *"fuse-bonded"* together and also teaches heat-calendering the paper-sheet (thus would have suggested to one in the art that, fiber-bonding at least occurs during the calendering step); this limitation would naturally flow from the teachings of Yamamoto et al. As for the limitation of avoiding "*flat bonding"*, such would also directly flow from the process of taught by Yamamoto et al, because (as noted above) the process taught by Yamamoto et al (using profiled rolls) bonds the fibrous web in a tension-free manner between profiled calender rolls without inhomogeneties over the cross-section of the non-woven fabric; and because according to Applicants disclosure on page 2 paragraph 2: *"To avoid essentially flat bonding, the fibrous web is bonded in a tension-free manner between profiled calender rolls without inhomogeneties over the cross-section of the non-woven fabric."*. In any event, such would have been obvious in the art because Norton also teaches not adversely affecting the porosity or filtering capacity of the paper (col. 1 lines 27-31). This teaching would have suggested to one in the art to avoid any pressed areas or flat spots (i.e. *"flat bonding"*) so that porosity or filtering capacity of the paper is not adversely affected.

In summary, though not explicitly disclosed by the above references, since the method recited in this claim is indistinguishable to the method taught by the art of record (i.e. appears to be identical), it is reasonably expected that the fibrous sheet, of Yamamoto et al using a pair of profiled calender rolls, is bonded in a tension-free manner, without inhomogeneities over the cross-section of the cross-section of the fibrous web and without the use of flat bonding.

As for a limitation of a fiber web being preheated prior to being calendered *"between non-heated profiled rolls"*, this limitation is essentially identical to dependent claim 3 set forth in an appeal brief. As noted in the Examiner's Answer, Yamamoto et al discloses fuse-bonding the undrawn fibers at a low temperature range of 110-200°C (col. 3 lines 9-21). This teaching would have reasonably suggested to one in the art to heat the paper-like sheet at a temperature sufficient to soften/melt the undrawn fibers in order to activate the undrawn fibers so that they can effectively function as binding fibers. In order words, during a calendering operation (whether heated or cooled calender rollers are used), one in the art would have ensured that, the paper-like sheet is sufficiently hot so that the undrawn fibers are softened/melted to effectively bond the fibers in the paper-like sheet. Moreover, absent any showing of unexpected benefit, a preference on whether to a) activate the undrawn (i.e. binder) fibers in a fiber web by pre-heating the web and then configuring the web using heated/unheated/cold profiled rolls, or b) simultananeously, activate the undrawn (i.e. binder) fibers in a fiber web and configure the web using heated profiled rolls is taken to be well within the purview of choice in the art. There is none, but only the expected

result, of heat-activating undrawn (i.e. binder) fibers in a fiber web to effectively profiled-bonding the web, would have been achieved in performing process choice "a" or "b". Moreover, it is well known and conventional in diverse fields of art to preheat a fiber web comprising undrawn (i.e. binder) fibers and drawn (i.e. matrix/structural) fibers, and then to calender the pre-heated web using unheated rollers as evidence from:

Thornton et al, drawn to making a thermally formed filter, discloses a prior art process where a fiber web is heated to a melting temperature of binder fibers and then compacted to a desired thickness using a pair of unheated rollers (col. 1 lines 45-57);

DE '053, drawn to making absorbent pads, discloses heating a fiber web comprising binder fibers using hot air, and then consolidating the heated web using a pair of cold rollers (abstract);

Frank, drawn to a nonwoven moldable composite, discloses a preferred method of consolidating a web, the method comprises through-air heating the web comprising binder fibers to melt the binder fibers, and then using a pair of pinch rollers to densify and cool the heated web; and further teaches that a heat-calendering operation to heat-densifying a web is alternative to the above process (col. 5 lines 6-43); and,

Gosden, drawn to making a staple fabric, discloses subjecting a web comprising bicomponent fibers to an oven to melt the binder component on each fiber, then passing the heated web to a pair of cold calender rolls (example 5).

Therefore, it would have been obvious in the art to perform the alternative calendering methods (i.e. process choice "a" or "b") in forming the corrugated (pleated) paper filter of Yamamoto et al. In other words, it would have been obvious in the art to preheat a fiber web and then to calender the web using a pair of unheated profiled rolls to form a fibrous sheet having spacers.

As for a newly added limitation of *"calendering ... without subsequent re-heating"*, a calendered web in embodiments disclosed in examples 13-14 is NOT subjected to another reheating operation. In fact, the process taught by Yamamoto teaches away from reheating a calendered web, particularly a corrugated calendered web at a temperature greater than the softening point of undrawn (i.e. binder) fibers, because it would loosen the inter-fibers bonding in the finished pleated filter medium, which in-turn would unwantedly or unnecessarily disfigure the finished pleated filter medium.

(11) Response to Argument

Toward the bottom on page 8, Appellant argues that the combination of references applied in the rejection fails to teach *"a method for manufacturing a pleated filter material that includes the step of calendering step without subsequent reheating, as recited in amended claim 1."* (emphasis added). Simply, because none of the references explicitly teaches a calendered web is not subsequently reheated, it does not necessarily mean that, a calendered web would/should be reheated. The references are not limited to what is expressly disclosed, but rather should be evaluated on what the references would have suggested to one in the art. In fact, as noted earlier, the process

taught by Yamamoto teaches away from reheating a calendered web, particularly a corrugated calendered web at a temperature greater than the softening point of undrawn (i.e. binder) fibers. Reheating a corrugated calendered web, especially at a temperature greater than a softening/melting point of undrawn (i.e. binder) fibers, would loosen the inter-fibers bonding in the finished corrugated calendered web. This in-turn would unwantedly or unnecessarily disfigure the finished corrugated calendered web.

In full paragraph 1 on page 9, Appellant cited a passage in examples 17-23 which states *"a paper-like sheet was formed at a speed of 12 m/min, dried at a temperature of 120 °C and, then, wound up."* (quotation and emphasis in original). As correctly noted by Appellant, the cited passage is directed to processes illustrated in examples 17-23 and not examples 13-14. A fiber web in Examples 17-23 are not subjected to a calendering operation. That's precisely the reason why a web which is formed by a paper-making process is heated to dry the web (col. 10 lines 21-32). On the other hand, in examples 13-14, a fiber web which is also formed by a paper-making process is subjected to a calendering operation. Hence, no subsequent heat-drying step is needed. Note: properties of a calendered web sheet are illustrated in Table 3; while the properties of a heated web sheet are illustrated in Table 4. As for Appellant's assertion that, *"... to the extent that Yamamoto describes that a subsequent re-heating step may be avoided, Yamamoto describes that such re-heating may only be avoided if the calender rolls that are employed are heated."* (emphasis in original). It is respectfully submitted that, Appellant is clearly mischaracterizing the teachings of Yamamoto. Nowhere in the teachings of Yamamoto which remotely suggests using the heated

calender rolls to avoid a subsequent re-heating operation. The application of heated calender rolls is used in order to activate thermo-activated undrawn (i.e. binder) in a fiber web. It has nothing to do about avoiding a subsequent re-heating step.

On page 9 last paragraph, Appellant argues that *"... Applicant has contended that examples 13 and 14 of Yamamoto et al do not teach or suggest that, after preheating the fibrous web, the fibrous web is calendered between non-heated profiled calender rolls in a single calendering step without subsequent re-heating."*. Examiner agrees. However, as repeatedly noted, absent any showing of unexpected benefit, it is taken to be well within the purview of choice in the art to choose from a limited number of known and effective ways of heat-activating undrawn (i.e. heat-activated binder) fibers and profiled rollers compressing a fiber web. None, but only the expected result (i.e. thermally activating undrawn (i.e. heat-activated binder) fibers in a web and consolidating the web to a desired configuration) would have been achieved. One in the art would have readily understood and appreciated that, it is not critical in a modified process of Yamamoto et al to use heated profiled rollers. Whether heating operation is performed before and/or during a compressing process using profiled rollers, and whether heated or unheated profiled rollers are used; what is important is to ensure that, the undrawn (heat-activated binder) fibers in a web are at a temperature of at least (preferably above) a softening temperature of the undrawn fibers to make them tacky, so that the fibers in the web can effectively be bonded and shaped to a desired configuration. Moreover, as also noted earlier, it is well known and conventional in diverse fields of art to preheat a fiber web comprising undrawn (i.e. binder) fibers and

drawn (i.e. matrix/structural) fibers, and then to calender the pre-heated web using unheated rollers

In response to Appellant's argument on page 10 regarding a pair of heated profiled calender rolls of Norton, it is true that, Norton teaches using heated profiled calender rolls. However, as repeatedly noted earlier, one in the art wanting to heat-activate undrawn fibers in a fiber web would have chosen among a limited numbers of calendering process to heat-activate undrawn fibers in the fiber web so as to soften/melt the undrawn fibers in order to effectively profiled-bond the fiber web. The teachings of Norton would have suggested to one in the art that a pair of profiled rollers can be effective in forming spacers to a fiber web in order to make a pleated filter medium. It is submitted that obviousness in the sense of 103 can be based on common sense and logic without any specific suggestion in the prior art relied upon. In re Bozek, 416 F.2d 1385, 163 USPQ 545, 549 (CCPA 1969). See also In re Sovish, 769 F. 2d 738, 226 USPQ 771, 774 (Fed. Cir. 1985). In this case, one in the art would have readily recognized and appreciated that in order to activate (i.e. soften/melt to make them tacky) the undrawn fibers, the web must be heated. It is well within the purview of choice in the art from known effective methods based on their suitability for their intended purpose or use. None but only the expected result of sufficiently softening/melting the undrawn fibers activate the them and effectively bond the fibers in the paper sheet would have been achieved.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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scy
September 30, 2004

Conferees

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